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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
DALEY, CLIFTON G	
ART UNIT	**PAPER NUMBER**
2609	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/687,432	OLSZAK, ARTUR G.
	Examiner	**Art Unit**
	Clifton G. Daley	2609

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 16 October 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 16 October 2003 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 10/16/2003.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because reference characters in Fig. 1 contain inverted commas. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 6, 20-22 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tafas et al. (Hereinafter "Tafas": US 6320174) in view of Michael et al. (Hereinafter "Michael": US 5768443).

Regarding **claim 1**, Tafas teaches a method of combining multiple frames of images acquired in a scan of an object surface with an array microscope to produce a composite image of the object surface (column 4, lines 55-60).

Tafas does not teach the steps of; calibrating said array microscope to derive correction factors for distortion in said images; and applying said correction factors to the multiple frames of images to obtain multiple frames of corrected images. However Michael discloses the steps of calibrating said array microscope (i.e. multi-camera system) to derive correction factors for distortion in said images (column 6, lines 23-31, i.e. correction map); and applying said correction factors to the multiple frames of images to obtain multiple frames of corrected images (column 6, lines 65-67).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Michael's teaching with Tafas' method. The motivation to combine being to correct for distortion errors in each image (Michael: column 2, lines 19 and 23).

Regarding **claim 2**, Tafas in combination with Michael teaches the method of claim 1, wherein said calibrating step includes deriving correction factors for chromatic aberrations produced by the array microscope in said images (Michael: column 6, lines

23-31, which is disclosed to include correction for chromatic aberration (column 6, line 44, i.e. chromatic distortion)).

Regarding **claim 6**, Tafas in combination with Michael teaches the method of claim 1, wherein said combining step is carried out by concatenating said multiple frames of corrected images (Tafas: column 4, lines 55-60); and said concatenating step is carried out by aligning an individual image from one of said corrected images with an adjacent individual image from another of said corrected images (Tafas: column 4, lines 60-64), and by repeating said alignment procedure for each pair of said multiple frames of corrected images (Tafas: column 6, lines 64-67).

Regarding **claim 20**, Tafas teaches a method of imaging an object surface with an array microscope comprising scanning said object surface to acquire multiple frames of said images with the array microscope (column 4, lines 32-43); and combining the multiple frames of images to produce a composite image of the object surface (column 4, lines 55-60).

Tafas does not teach calibrating the array microscope to derive correction factors designed to correct imaging characteristics of individual microscopes in the array microscope in order to normalize an output thereof and produce images with uniform optical properties; and applying said correction factors to the multiple frames of images to obtain multiple frames of corrected images. However Michael discloses the steps comprising calibrating the array microscope (i.e. multi-camera system) to derive correction factors designed to correct imaging characteristics of individual microscopes

in the array microscope in order to normalize an output thereof and produce images with uniform optical properties (column 6, lines 23-31, i.e. correction map); and applying said correction factors to the multiple frames of images to obtain multiple frames of corrected images (column 6, lines 65-67).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Michael's teaching with Tafas' method. The motivation to combine being to correct for distortion errors in each image (Michael: column 2, lines 19 and 23).

Regarding **claim 21**, Tafas in combination with Michael teaches the method of claim 20, wherein said imaging characteristics comprise at least one among spectral response, gain, offset, distortion, and chromatic aberration (Michael: column 6, lines 43-48).

Regarding **claim 22**, Tafas in combination with Michael teaches the method of claim 20, wherein said combining step is carried out by concatenating said multiple frames of corrected images (Tafas: column 4, lines 55-60); and said concatenating step is carried out by aligning an individual image from one of said corrected images with an adjacent individual image from another of said corrected images (Tafas: column 4, lines 60-64), and by repeating said alignment procedure for each pair of said multiple frames of corrected images (Tafas: column 6, lines 64-67).

Regarding **claims 24 - 26**, since method and apparatus are analogous, the apparatus means are obvious over Tafas in view of Michael as disclosed in claims 20-22

above. Michael also discloses calibrating means wherein said calibrating means consists of sample surfaces with predetermined physical characteristics designed to produce target images with predetermined optical properties, so that deviations from said predetermined optical properties may be used to compute correction factors relative to said imaging characteristics (Fig. 2).

4. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tafas in view of Michael and further in view of Lin et al. (Hereinafter "Lin": US 6069973).

Tafas in combination with Michael teaches the method of claim 1 as disclosed above. Tafas in combination with Michael do not teach the limitation wherein said calibrating step includes deriving correction factors for producing a uniform spectral response throughout the array microscope. However Lin discloses a calibration step for multiple imaging chips wherein the calibration step includes deriving correction factors for producing a uniform spectral response throughout the array microscope (i.e. multi-chip sensor, column 2, lines 15-22).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Lin's method with the combined teaching of Tafas and Michael. The motivation to combine being to reduce image quality degradation (Lin: column 1, lines 55-57).

5. Claims 4, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tafas in view of Michael and further in view of Brown (US Patent Application 2001/0038717).

Regarding **claims 4 and 5**, Tafas in combination with Michael teaches the method of claim 1 as disclosed above. Tafas in combination with Michael do not teach the limitation wherein said calibrating step includes deriving correction factors for producing a uniform gain and a uniform offset throughout the array microscope. However Brown discloses a calibration method for a multi-image system (i.e. array microscope) wherein said calibrating method includes deriving correction factors for producing a uniform gain and uniform offset throughout the array microscope (page 1, ¶0011, i.e. gain map and offset map).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Brown's method with the combined teaching of Tafas and Michael. The motivation to combine being to minimize non-uniformity in detector response (Brown: page 1, ¶0010, lines 8-10).

Regarding **claim 7**, Tafas in combination with Michael teaches the method of claim 1 as disclosed above. Tafas in combination with Michael do not teach the limitation wherein said combining step is carried out by stitching said multiple frames of corrected images. However Brown discloses a step for combining multiple frames wherein said combining step is carried out by stitching said multiple frames of corrected images (i.e. edge connection, page 2, ¶0032, lines 1-9); and said stitching step is carried out by aligning an individual image from one of said corrected images with an adjacent individual image from another of said corrected images, and by repeating said

alignment procedure for each pair of said multiple frames of corrected images (Michael: column 4, lines 50-57, i.e. landmarks for position and orientation for each image).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Brown's method with the combined teaching of Tafas and Michael. The motivation to combine being to minimize discontinuities between frames (Brown: page 2, ¶0031, lines 1-3).

6. Claims 23 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tafas in view of Michael and further in view of Brown.

Regarding **claim 23**, Tafas in combination with Michael teaches the method of claim 20, as disclosed above. Tafas in combination with Michael do not teach the limitation wherein said combining step is carried out by stitching said multiple frames of corrected images. However Brown discloses a step for combining multiple frames wherein said combining step is carried out by stitching said multiple frames of corrected images (i.e. edge connection, page 2, ¶0032, lines 1-9); and said stitching step is carried out by aligning an individual image from one of said corrected images with an adjacent individual image from another of said corrected images, and by repeating said alignment procedure for each pair of said multiple frames of corrected images (Michael: column 4, lines 50-57, i.e. landmarks for position and orientation for each image).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Brown's method with the combined teaching of Tafas and Michael. The motivation to combine being to minimize

discontinuities between frames (Brown: page 2, ¶0031, lines 1-3). The method of claim 20, wherein said combining step is carried out by stitching said multiple frames of corrected images; said stitching step is carried out by aligning an individual image from one of said corrected images with an adjacent individual image from another of said corrected images, and by repeating said alignment procedure for each pair of said multiple frames of corrected images.

Regarding **claim 27**, since method and apparatus are analogous, the apparatus means are obvious over Tafas combined with Michael and Brown as disclosed in claim 23 above.

7. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tafas in view of Lin.

Tafas teaches a method of combining multiple frames of images acquired in a scan of an object surface with an array microscope to produce a composite image of the object surface (column 4, lines 55-60). Tafas does not teach the limitations comprising the following steps: calibrating said array microscope to derive correction factors to produce a uniform spectral response throughout said array microscope; and applying said correction factors to said multiple frames of images to obtain multiple frames of corrected images. However Lin discloses the steps of calibrating said array microscope (i.e. multi-chip image sensor) to derive correction factors to produce a uniform spectral response throughout said array microscope (column 2, lines 15-22);

and applying said correction factors to said multiple frames of images to obtain multiple frames of corrected images (column 5, lines 3-7).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Lin's method with the Tafas' teaching. The motivation to combine being to reduce image quality degradation (Lin: column 1, lines 55-57).

8. Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tafas in view of Lin and further in view of Michael.

Regarding **claim 9**, Tafas combined with Lin teach the method of claim 8 as disclosed above. Tafas combined with Lin do not teach the limitation wherein said calibrating step includes deriving correction factors for chromatic aberrations produced by the array microscope in said images. However Michael discloses the step of deriving correction factors for chromatic aberrations produced by the array microscope (i.e. multi-camera system) in said images (column 6, lines 23-31, which is disclosed to include correction for chromatic aberration (column 6, line 44, i.e. chromatic distortion)

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Michael's teaching with Tafas' method. The motivation to combine being to correct for distortion errors in each image (Michael: column 2, lines 19 and 23).

Regarding **claim 12**, Tafas in combination with Lin and Michael teach the method of claim 9, as disclosed above, wherein said combining step is carried out by

concatenating said multiple frames of corrected images (Tafas: column 4, lines 55-60); and said concatenating step is carried out by aligning an individual image from one of said corrected images with an adjacent individual image from another of said corrected images (Tafas: column 4, lines 60-64), and by repeating said alignment procedure for each pair of said multiple frames of corrected images (Tafas: column 6, lines 64-67).

9. Claims 10, 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tafas in view of Lin and in view of Michael and further in view of Brown.

Regarding **claims 10 and 11**, Tafas in combination with Lin and Michael teach the method of claim 9 as disclosed above. They do not teach the limitations wherein said calibrating step includes deriving correction factors for producing a uniform gain throughout the array microscope. However Brown discloses a calibration method for a multi-image system (i.e. array microscope) wherein said calibrating method includes deriving correction factors for producing a uniform gain and uniform offset throughout the array microscope (page 1, ¶0011, i.e. gain map and offset map).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Brown's method with the combined teaching of Tafas, Lin and Michael. The motivation to combine being to minimize non-uniformity in detector response (Brown: page 1, ¶0010, lines 8-10).

Regarding **claim 13**, Tafas in combination with Lin and Michael teach the method of claim 9 as disclosed above. They do not teach the limitations wherein said combining step is carried out by stitching said multiple frames of corrected images.

However Brown discloses a step for combining multiple frames wherein said combining step is carried out by stitching said multiple frames of corrected images (i.e. edge connection, page 2, ¶0032, lines 1-9); and said stitching step is carried out by aligning an individual image from one of said corrected images with an adjacent individual image from another of said corrected images, and by repeating said alignment procedure for each pair of said multiple frames of corrected images (Michael: column 4, lines 50-57, i.e. landmarks for position and orientation for each image).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Brown's method with the combined teaching of Tafas, Lin and Michael. The motivation to combine being to minimize discontinuities between frames (Brown: page 2, ¶0031, lines 1-3).

10. Claims 14, 15, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tafas in view of Brown.

Regarding **claims 14 and 15**, Tafas teaches a method of combining multiple frames of images acquired in a scan of an object surface with an array microscope to produce a composite image of the object surface (column 4, lines 55-60).

Tafas does not teach the steps of; calibrating said array microscope to derive correction factors to produce a uniform gain and a uniform offset throughout said array microscope; and applying said correction factors to said multiple frames of images to obtain multiple frames of corrected images. However Brown discloses a calibration method for a multi-image system (i.e. array microscope) wherein said calibrating

method includes deriving correction factors for producing a uniform gain and uniform offset throughout the array microscope (page 1, ¶0011, i.e. gain map and offset map); and applying said correction factors to said multiple frames of images to obtain multiple frames of corrected images (page 1, ¶0012, i.e. equation for Desired_image).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Brown's method with the combined teaching of Tafas and Michael. The motivation to combine being to minimize non-uniformity in detector response (Brown: page 1, ¶0010, lines 8-10).

Regarding **claim 18**, Tafas in combination with Brown teaches the method of claim 14, as disclosed above, wherein said combining step is carried out by concatenating said multiple frames of corrected images (Tafas: column 4, lines 55-60); and said concatenating step is carried out by aligning an individual image from one of said corrected images with an adjacent individual image from another of said corrected images (Tafas: column 4, lines 60-64), and by repeating said alignment procedure for each pair of said multiple frames of corrected images (Tafas: column 6, lines 64-67).

Regarding **claim 19**, Tafas in combination with Brown teaches the method of claim 14, as disclosed above, wherein said combining step is carried out by stitching said multiple frames of corrected images (i.e. edge connection, page 2, ¶0032, lines 1-9); and said stitching step is carried out by aligning an individual image from one of said corrected images with an adjacent individual image from another of said corrected images, and by repeating said alignment procedure for each pair of said multiple frames

of corrected images (Michael: column 4, lines 50-57, i.e. landmarks for position and orientation for each image).

11. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tafas in view of Brown and further in view of Michael.

Tafas combined with Brown teach the method of claim 14, as disclosed above. Tafas combined with Brown do not teach the limitation wherein said calibrating step includes deriving correction factors for chromatic aberrations produced by the array microscope in said images. However Michael discloses the step of deriving correction factors for chromatic aberrations produced by the array microscope (i.e. multi-camera system) in said images (column 6, lines 23-31, which is disclosed to include correction for chromatic aberration (column 6, line 44, i.e. chromatic distortion)

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Michael's teaching with Tafas' method. The motivation to combine being to correct for distortion errors in each image (Michael: column 2, lines 19 and 23).

12. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tafas in view of Brown and further in view of Lin.

Tafas in combination with Brown teaches the method of claim 1, as disclosed above. Tafas in combination with Brown do not teach the limitation wherein said calibrating step includes deriving correction factors for producing a uniform spectral response throughout the array microscope. However Lin discloses a calibration step for

multiple imaging chips wherein the calibration step includes deriving correction factors for producing a uniform spectral response throughout the array microscope (i.e. multi-chip sensor, column 2, lines 15-22).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Lin's method with the combined teaching of Tafas and Michael. The motivation to combine being to reduce image quality degradation (Lin: column 1, lines 55-57).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lam et al. (US 5694481) discloses distortion calibration and stitching of images. Yamauchi et al. (US Patent Application 2001/0045988) discloses calibration for spectral response). Szeliski et al. (US 6157747) discloses distortion correction, image alignment and combination.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Clifton G. Daley whose telephone number is 571-270-3144. The examiner can normally be reached on Monday - Friday 7:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on 571-272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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CGD
8/17/2007